

What is claimed is:

### Claims

5 1. A multiple-protocol home location register comprising:

a receiver for receiving, from a requesting network of at least two networks, a network request according to one of at least two network protocols;

10 a processor, within the multiple-protocol home location register, wherein the processor is arranged and constructed to generate network messages according to the at least two network protocols and to process the network request to obtain information requested by the network request;

15 a transmitter, operably coupled to the processor, for relaying the requested information to at least one of the requesting network and a destination network.

20 2. The multiple-protocol home location register of claim 1, wherein the processor is further arranged and constructed to translate messages according to the at least two network protocols.

25 3. The multiple-protocol home location register of claim 1, wherein the at least one query is generated in response to a communication device request to communicate with a serving network.

30 4. The multiple-protocol home location register of claim 1, wherein the processor is further arranged and constructed to send a profile for a communication device to a serving network and to format the profile according to the serving network's protocol.

5. A method comprising the steps of:

receiving, by a multiple-protocol home location register, a network request from a requesting network of at least two requesting networks, wherein the network  
5 request is composed according to one of at least two network protocols;

processing the network request to obtain information requested by the network request;

10 generating at least one network message according to at least one of the at least two network protocols and sending the at least one network message to at least one network supporting the at least one of the at least two network protocols;

15 relaying the requested information to a destination network.

6. The method of claim 5, wherein the step of processing comprises the step of translating the network request.

20 7. The method of claim 5, wherein the step of processing comprises the step of converting a Location Request message to a Provide Roaming Number message.

8. The method of claim 5, wherein the step of processing comprises the step of  
25 converting a Send Routing Information message to a Routing Request message.

9. The method of claim 5, wherein the step of processing comprises the step of distributing, throughout the multiple-protocol home location register, subscriber information for a plurality of communication devices.

30

10. The method of claim 5, wherein the step of processing comprises the step of determining and storing a protocol type and an address for an infrastructure device.

- 5 11 The method of claim 10, wherein the infrastructure device is a gateway mobile switching center.

12. The method of claim 5, wherein the step of processing comprises the step of determining and storing a protocol type and an address for a communication  
10 device.

13. The method of claim 12, wherein the step of processing comprises the step of determining and storing a protocol type and an address for a serving network for the communication device.

14. The method of claim 5, wherein the multiple-protocol home location register receives a network request, regarding a communication device, from an infrastructure device, regardless of the communication device's native mode protocol.

15  
20  
25 15. The method of claim 5, further comprising the step of detecting a protocol type for an infrastructure device, and when the protocol type for the infrastructure device is not a first network protocol, communicating through a mediation device to a home location register of the protocol type for the infrastructure device.

16. The method of claim 5, wherein any infrastructure device is at least one of a terminating mobile switching center, a visited mobile switching center, a gateway mobile switching center, a packet gateway, and an internet protocol  
30 gateway.

17. The method of claim 5, further comprising the step of storing call forwarding information such that processing for call forwarded communications takes place between a mediation device in the multiple-protocol home location register and a terminating mobile switching center.

5

18. The method of claim 5, further comprising the step of issuing an instruction to a previous mobile switching center to delete a visited location register for a communication device.

10

19. The method of claim 5, wherein the step of processing comprises the step of storing an identification of an infrastructure device that terminates a call.

20. The method of claim 5, wherein the step of processing comprises the step of determining whether a communication device supports multiple-mode operation.

15

21. The method of claim 5, wherein the step of processing comprises the step of converting a short messaging service message from a first network protocol to a second network protocol.

20

22. The method of claim 5, wherein the step of processing comprises the steps of routing a pre-paid call, originating according to a first protocol of the at least two network protocols, to an infrastructure device operating according to a second protocol of the at least two network protocols and handling the pre-paid call according to normal call processing procedures for the second protocol.

25

23. The method of claim 5, wherein any infrastructure device is one of a terminating mobile switching center, a visited mobile switching center, a gateway mobile switching center, a packet gateway, and an internet protocol gateway.

30

24. The method of claim 5, wherein the destination network is determined by a location for a communication device associated with the network request.

25. A multiple-protocol home location register (HLR) comprising:

a first HLR arranged and constructed to provide a first network protocol;

5 a second HLR arranged and constructed to provide a second network protocol;

a mediation device, operably coupled to the first HLR and the second HLR,  
wherein the mediation device is arranged and constructed to generate network  
messages according to the first network protocol and the second network

10 protocol, such that the multiple-protocol HLR provides HLR capability for a  
plurality of communication devices utilizing any of the first network protocol and  
the second network protocol.

15 26. The multiple-protocol HLR of claim 25, wherein the mediation device is  
further arranged and constructed to translate messages between the first  
network protocol and the second network protocol.

20 27. The multiple-protocol HLR of claim 25, wherein the mediation device is  
arranged and constructed to convert a Provide Roaming Number message to a  
Location Request message.

25 28. The multiple-protocol HLR of claim 25, wherein the mediation device is  
arranged and constructed to convert a Routing Request message to a Send  
Routing Information message.

29. The multiple-protocol HLR of claim 25, further comprising a provisioning  
gateway, operably coupled to the first HLR and the second HLR, wherein the  
provisioning gateway is arranged and constructed to distribute, among the first  
30 HLR and the second HLR, subscriber information for the plurality of  
communication devices.

30. The multiple-protocol HLR of claim 25, wherein the first and second network protocols comprise at least one of ANSI-41, GSM MAP, SIP, H.323, AAA, and M-IP.

5 31. The multiple-protocol HLR of claim 25, wherein the mediation device is further arranged and constructed to determine and store a protocol type and an address for an infrastructure device.

10 32. The multiple-protocol HLR of claim 31, wherein the infrastructure device is a gateway mobile switching center.

15 33. The multiple-protocol HLR of claim 31, wherein the mediation device is further arranged and constructed to determine and store a protocol type and an address for a communication device.

34. The multiple-protocol HLR of claim 33, wherein the mediation device is further arranged and constructed to determine and store a protocol type and an address for a serving network for the communication device.

20 35. The multiple-protocol HLR of claim 25, wherein the first HLR is further arranged and constructed to receive a query, regarding a communication device, from an infrastructure device supporting the first network protocol, regardless of whether the communication device's native mode is of the first network protocol.

25 36. The multiple-protocol HLR of claim 25, wherein the first HLR is further arranged and constructed to detect whether a protocol type for an infrastructure device, and when the protocol type for the infrastructure device is not the first network protocol, to communicate through the mediation device to an HLR of the protocol type for the infrastructure device.

37. The multiple-protocol HLR of claim 25, wherein the mediation device is further arranged and constructed to store call forwarding information such that processing for call forwarded communications takes place between the mediation device and a terminating mobile switching center.

5

38. The multiple-protocol HLR of claim 25, wherein any infrastructure device is one of a terminating mobile switching center, a visited mobile switching center, a gateway mobile switching center, a packet gateway, and an internet protocol gateway.

09/11/2014 10:23:04

39. A system comprising:

a first infrastructure device arranged and constructed to generate at least one query according to a first network protocol;

5

a second infrastructure device arranged and constructed to function according to a second network protocol;

10 a multiple-protocol home location register, operably coupled to the first infrastructure device and the second infrastructure device, wherein the multiple-protocol home location register is arranged and constructed to function according to the first network protocol and the second protocol, such that a call request according to the first network protocol and related to the at least one query is completed according to the second network protocol.

15

40. The system of claim 39, wherein the at least one query is generated in response to a communication device request to communicate with a serving network.

20

41. The system of claim 40, wherein a profile for the communication device is sent to the serving network and the profile is formatted according to the serving network's protocol.

25

42. The system of claim 40, wherein the serving network utilizes the first network protocol.

43. The system of claim 39, wherein the multiple-protocol home location register is further arranged and constructed to provide call forwarding functionality.

30



44. The system of claim 39, wherein the call request is a call termination request.

45. The system of claim 39, further comprising a provisioning gateway, operably coupled to the multiple-protocol home location register, wherein the provisioning gateway is arranged and constructed to provide subscriber information for the plurality of communication devices.

46. The system of claim 39, wherein the first and second network protocols comprise at least one of ANSI-41, GSM MAP, SIP, H.323, AAA, and M-IP.

47. The system of claim 39, wherein the multiple-protocol home location register is further arranged and constructed to determine and store a protocol type and an address for the first infrastructure device.

48. The system of claim 39, wherein the first infrastructure device is further arranged and constructed to receive a request from a communication device regardless of whether the communication device's native mode is of the first network protocol.

49. The system of claim 39, wherein the multiple-protocol home location register is further arranged and constructed to store call forwarding information such that processing for call forwarded communications takes place between the multiple-protocol home location register and the second infrastructure device.

50. The system of claim 39, wherein any infrastructure device is one of a terminating mobile switching center, a visited mobile switching center, a gateway mobile switching center, a packet gateway, and an internet protocol gateway.

51. The system of claim 39, wherein the first infrastructure device is a gateway mobile switching center.

52. The system of claim 39, wherein the second infrastructure device is a  
5 terminating mobile switching center.

51. The system of claim 39, wherein the first infrastructure device is a gateway mobile switching center.

53. A method comprising the steps of:

generating, by a first infrastructure device, a query according to a first network protocol;

5

sending the first network protocol query to a multiple-protocol home location register functioning according to the first network protocol and a second network protocol;

10 processing, by the multiple-protocol home location register, the first network protocol query, thereby generating a second network protocol message;

sending the second network protocol message to a second infrastructure device functioning according to the second network protocol.

15

54. The method of claim 53, wherein the step of processing comprises the step of translating the network request.

20 55. The method of claim 53, wherein the step of processing comprises the step of converting a Location Request message to a Provide Roaming Number message.

25 56. The method of claim 53, wherein the step of processing comprises the step of converting a Routing Request message to a Send Routing Information message.

30 57. The method of claim 53, wherein the step of processing comprises the step of distributing, throughout the multiple-protocol home location register, subscriber information for a plurality of communication devices.

58. The method of claim 53, wherein the step of processing comprises the step of determining and storing a protocol type and an address for the first infrastructure device.

5 59. The method of claim 53, wherein the multiple-protocol home location register receives a network request, regarding a communication device, from the first infrastructure device, regardless of the communication device's native mode protocol.

10 60. The method of claim 53, further comprising the step of detecting a protocol type for the second infrastructure device, and when the protocol type for the second infrastructure device is not the first network protocol, processing the first network protocol query according to the protocol type for the second infrastructure device.

15 61. The method of claim 53, further comprising the step of storing call forwarding information such that processing for call forwarded communications takes place between the multiple-protocol home location register and the second infrastructure device.

20 62. The method of claim 53, further comprising the step of issuing an instruction to a previous mobile switching center to delete a visited location register for a communication device.

25 63. The method of claim 53, wherein the step of processing comprises the step of storing an identification of the second infrastructure device for a call.

30 64. The method of claim 53, wherein the step of processing comprises the step of determining whether a communication device supports multiple-mode operation.

65. The method of claim 53, wherein the step of processing comprises the step of converting a short messaging service message from a first network protocol to a second network protocol.

5 66. The method of claim 53, wherein the step of processing comprises the steps of routing a pre-paid call, originating according to the first protocol, to a third infrastructure device and handling the pre-paid call according to normal call processing procedures for the second protocol.

10 67. The method of claim 66, wherein the step of routing is based on at least one of a prefix plus a called party number and a different number.

15 68. The method of claim 53, wherein any infrastructure device is one of a terminating mobile switching center, a visited mobile switching center, a gateway mobile switching center, a packet gateway, and an internet protocol gateway.

20 69. The method of claim 53, wherein the first infrastructure device is a gateway mobile switching center.

70. The method of claim 53, wherein the second infrastructure device is a terminating mobile switching center.

25 71. The method of claim 53, wherein the step of processing comprises the steps of routing a call, originating according to the first protocol, to a third infrastructure device of the second protocol and handling the call according to normal call processing procedures for the second protocol.